National Institute of Environmental Health Sciences

Hantavirus disease (nephropathia epidemica) in Belgium: Effects of tree seed production and climate

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Abstract:

Recently, human cases of nephropathia epidemica (NE) due to Puumala virus infection in Europe have increased. Following the hypothesis that high reservoir host abundance induces higher transmission rates to humans, explanations for this altered epidemiology must be sought in factors that cause bank vole (Myodes glareolus) abundance peaks. In Western Europe, these abundance peaks are often related to high tree seed production, which is supposedly triggered by specific weather conditions. We evaluated the relationship between tree seed production, climate and NE incidence in Belgium and show that NE epidemics are indeed preceded by abundant tree seed production. Moreover, a direct link between climate and NE incidence is found. High summer and autumn temperatures, 2 years and 1 year respectively before NE occurrence, relate to high NE incidence. This enables early forecasting of NE outbreaks. Since future climate change scenarios predict higher temperatures in Europe, we should regard Puumala virus as an increasing health threat.

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Resource Description

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☒

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Precipitation, Temperature

Temperature: Fluctuations

Geographic Feature: ☒

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Belgium

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Zoonotic Disease

Zoonotic Disease: Hantavirus Pulmonary Syndrome

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Short-Term (

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content